

WHAT IS CLAIMED IS:

1. A display system for an aircraft, comprising:

a central unit configured to determine a speed vector of the aircraft and to determine a longitudinal margin of maneuver of the aircraft, wherein the longitudinal margin of maneuver is expressed as a load factor and is related to one of a pitch-up maneuver and a pitch-down maneuver; and

a display unit connected to the central unit and including a display screen configured to display a first characteristic sign illustrating the speed vector and a second characteristic sign illustrating the longitudinal margin of maneuver.

2. The display system of Claim 1, wherein the display screen is a heads-up display screen.

3. The display system of Claim 1, wherein a distance between the first characteristic sign and the second characteristic sign is proportional to the longitudinal margin of error.

4. The display system of Claim 1, wherein,

the first characteristic sign is shaped as a diamond, and

the second characteristic sign is shaped as a chevron.

5. The display system of Claim 1, wherein the central unit includes,

a first determining unit configured to determine a longitudinal margin of maneuver related to a pitch-up maneuver, and

a second determining unit configured to determine a longitudinal margin of maneuver related to a pitch-down maneuver.

6. The display system of Claim 5, wherein the first determining unit determines the longitudinal margin by selecting the smaller of a first load factor margin and an angle of incidence margin.

7. The display system of Claim 6, wherein the angle of incidence margin is calculated from the following expression:

$$\Delta\alpha = 1 - [(N_z / \Delta N_{\max}) * ((\alpha_{\max} - \alpha) / (\alpha - \alpha_0))],$$

wherein $\Delta\alpha$ is the angle of incidence margin, N_z is a load factor, ΔN_{\max} is a maximum value of margin of maneuver depicted, α is a angle of incidence, α_{\max} is a maximum angle of incidence, and α_0 is a zero lift angle of incidence.

8. The display system of Claim 5, wherein the second determining unit determines the longitudinal margin by selecting the smaller of a first load factor margin and a speed margin.

9. The display system of Claim 8, wherein the speed margin is calculated from the following expression:

$$\Delta V = 1 - [(N_z + K_p(V_{\max} - V) - K_d(dV/dt)) / \Delta N_{\max}],$$

wherein ΔV is the speed margin, N_z is a load factor, ΔN_{\max} is a maximum value of margin of maneuver depicted, V is the speed of the aircraft, V_{\max} is a maximum speed of the aircraft, (dV/dt) is a derivative with respect to time of the speed V , and K_p and K_d are predetermined parameters.

10. The display system of Claim 1, wherein the display unit displays the second characteristic sign only when the determined longitudinal margin of maneuver is less than a predetermined value.

11. A display system for an aircraft, comprising:

a central unit including,

a first determining unit configured to determine a speed vector of the aircraft,

and

a second determining unit configured to determine a longitudinal margin of maneuver of the aircraft; and

a display unit including a display screen configured to display a first characteristic sign illustrating the speed vector of the aircraft and a second characteristic sign illustrating the longitudinal margin of maneuver of the aircraft.

12. The display system of Claim 11, wherein the second determining unit includes, a first selecting unit configured to determine a longitudinal margin of maneuver related to a pitch-up maneuver by selecting the smaller of a pitch-up load factor margin and an angle of incidence margin.

13. The display system of Claim 12, wherein the second determining unit includes, a second selecting unit configured to determine a longitudinal margin of maneuver related to a pitch-down maneuver by selecting the smaller of a pitch-down load factor margin and a speed margin.

14. The display system of Claim 13, wherein the second determining unit includes, a first margin calculating unit configured to determine the pitch-up load factor margin, a second margin calculating unit configured to determine the angle of incidence margin,

a third margin calculating unit configured to determine the pitch-down load factor margin, and

a fourth margin calculating unit configured to determine the speed margin.